

years (SN: 6/29/96, p. 406), growers have become very protective of those pollinators that remain and are keen to test insecticides that would minimize ancillary damage to honey bees, he says.

**F**armers need a broad arsenal of weapons so they can tailor the attacks on rootworms according to the crop, conditions, and the insects' resistance to pesticides.

Both Slam and Adios rely on carbaryl to kill adult rootworms. "We know that we probably need to develop some alternative active ingredients," says Morris Gaskins of Micro Flo Co., the products' Memphis-based manufacturer. Moreover, Gaskins notes that the company is seeking alternatives to buffalo-gourd root as its source of cucurbitacin. "We have found several varieties of cucumbers that have extremely high concentrations of these compounds and are much easier to grow," he says.

Schroder's group is also investigating an alternative source of cucurbitacin: the root of a wild Brazilian plant called taiuia. Schroder and USDA ecologist Guillermo Cabrera Walsh, based in Buenos Aires, independently encountered South American corn growers who were extolling taiuia's ability to lure rootworm beetles away from their crops. Local farmers sliced the cassava-like root, soaked it overnight in insecticide, then set it out in

## Different pest, similar tactic



A corn earworm moth feeds on the nectar of a *Gaura* plant, a night-blooming

relative of evening primrose. This insect costs U.S. farmers \$2 billion annually. USDA scientists in College Station, Texas, are working to harness chemicals responsible for this flower's perfumed scent to attract the earworm—also known as the cotton bollworm, tomato fruit worm, and sorghum head worm—to pesticides. As with the lethal treats being designed for rootworms, trace quantities of the earworm poisons would be dissolved in a liquid tailored to the pest's palate. That will probably be sugars, explains Juan Lopez Jr., an entomologist who's been working on the project for 8 years. —J.R.

the fields as bait.

Cabrera Walsh's experiments with taiuia indicate that this plant actually "draws cucumber beetles away from the corn—often from quite a distance." He even sprays extracts of it on cloth as a bait to collect live beetles for study. In contrast, insects have to contact the cucurbitacin in buffalo gourd and the bitter melon before they feed on it.

"In theory, [all] the cucurbitacin molecules are too heavy to become airborne," Cabrera Walsh says. This suggests that some other agent in the root may be the airborne lure that rings a dinner bell for the pest. "So, we are trying to investigate that—because an attractant, if it were a different substance

[than the bitter compound]—could be important" as an adjunct to any future pesticides.

Indeed, if it worked well enough, a bait in traps between crop rows might obviate the need to actually treat plants directly.

The important thing to remember, Chandler cautions, is that no matter how well it works, no insecticide is likely to eradicate a pest. "The best we can hope for is to control it" at a cost that doesn't prove prohibitive, he says.

For corn and other crops, the bitter medicines under development offer not only a partial cure to their rootworm ills, but one having a minimum of environmental side effects. □

## Biology

From Lewisburg, Pa., at the annual meeting of the Animal Behavior Society

### Damselfly nightlife has its own traditions

Damselflies may not have holiday barbecues, but they do have traditional roosting places, according to a new study of their nighttime gathering spots.

The twigs, grass blades, or other perches look like miniature versions of the trees or bridges where flocks of starlings or cowbirds spend the night, note Paul V. Switzer of Eastern Illinois University in Charleston and Gregory F. Grether of the University of California, Santa Barbara.



A rubyspot damselfly roosts near fake insects.

By day, male rubyspot damselflies in California lead a macho life. They defend empires of a square meter or so from intruding males and chase whatever females flit by. As night falls, however, the action shuts down. Groups of up to 75 males and females return to a roosting place and show no

inclination to mate or fight. "A male could be a quarter of an inch away from some male he was beating up on during the day," Grether remarks.

He and Switzer wondered whether the nightspots represent some kind of tradition, selected primarily because insects had used them the previous evening. Alternatively, the gathering places could represent the only good choices for spending the night.

At unused spots, the researchers set fake damselflies made of paperclips and clay and observed that real insects settled down next to them for the night. After a week, researchers removed the fake insects and found that damselflies continued to cluster at the

new roosts. This willingness to accept a new site led Switzer and Grether to argue that damselflies have tradition. Switzer even goes so far as to say, "It is culture." —S.M.

### What color is your carnivore?

The splotches, rings, and stripes on a carnivore's face reveal the fingerprints of evolutionary forces in its past, argues Alessia Ortolani of the University of California, Davis. She is trying to crack the code.

Ortolani pieced together a huge family tree showing the evolutionary relationships of 200 terrestrial carnivores. Its twigs bristle with dogs, cats, hyenas, and weasels, as well as lesser-known species such as somewhat catlike African genets. Then, Ortolani focused on particular facial markings, looking for patterns in the histories of the animals that bear them.



Natural white eyeliner turns up often in nocturnal carnivores.

In her analysis, white markings around the eyes, like the crescents under a tiger's eyes, often appear in lineages of nocturnal predators that prowled dense forests. The white marks could have aided communication among creatures sorting out friends and foes by their facial expressions in the gloom, Ortolani speculates.

In lineages of grassland species, like African wild dogs, that roam open spaces, Ortolani found many dark muzzles. In daylight, these features stand out, suggesting they might serve as a conspicuous signal for diurnal animals. —S.M.